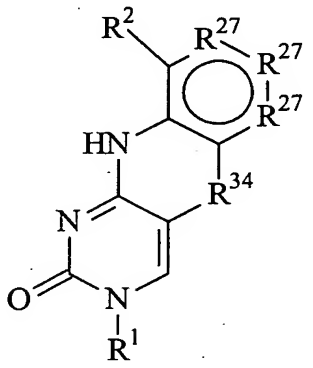
This listing of claims will replace all prior versions, and listings, of claims in the application.

**Listing of Claims:**

1. (Currently Amended). A compound having the structure (1):



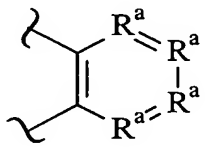
(1)

and tautomers, solvates and salts thereof, wherein

$R^1$ is an oligonucleotide, a protecting group, a linker or -H;

$R^2$ is $A(Z)_{X1}$, wherein A is a spacer and Z independently is a label bonding group optionally bonded to a detectable label, but $R^2$ is not ~~amine~~ NH2, protected ~~amine~~ NH2, nitro or cyano;

$R^{27}$ is independently -CH=, -N=, -C($C_1$-$C_8$ alkyl)= or -C(halogen)=, but no adjacent $R^{27}$ are both -N=, or two adjacent $R^{27}$ are taken together to form a ring having the structure,



where $R^a$ is independently -CH=, -N=, -C($C_1$-$C_8$ alkyl)= or -C(halogen)=, but no adjacent $R^a$ are both -N=;

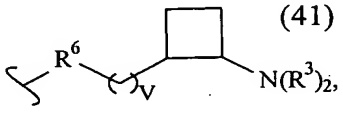
$R^{34}$ is -O-, -S- or -N($CH_3$)-; and

and $X^1$ is 1, 2 or 3.

2 (Original). The compound of claim 1 wherein $R^2$ is -$R^{2C}$-$R^{2D}$, wherein $R^{2C}$ is a short spacer chain and $R^{2D}$ is a hydrogen bond donor moiety or a moiety having a net positive charge of at least about +0.5 at pH 6-8 in aqueous solutions.

3. (Previously Presented) The compound of claim 1, wherein $R^2$ is -$R^6$-($CH_2$)$_t$$NR^5C(NR^5)N(R^3)_2$, -$R^6$-$CH_2$-$CHR^{31}$-$N(R^3)_2$, -$R^6$-$(R^7)_v$-$N(R^3)_2$, -$R^6$-($CH_2$)$_t$-$N(R^3)_2$, -($CH_2$)$_{1-2}$-O-($CH_2$)$_t$-$N(R_3)_2$,


(40)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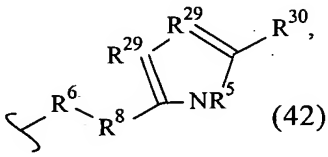
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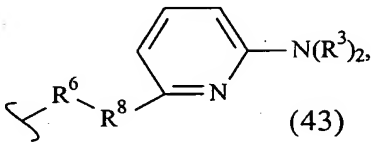
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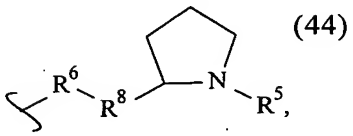
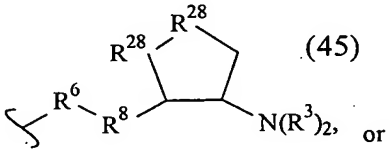
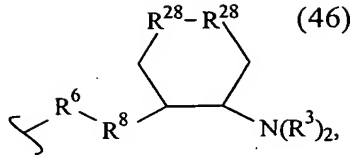
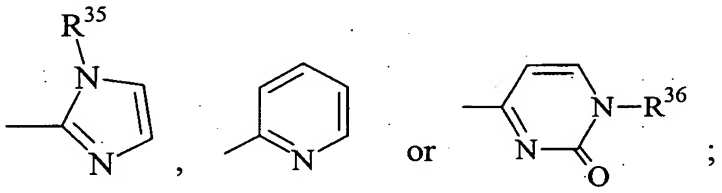

(44)


(45) or



(46)

$R^3$ is independently -H, $-CH_3$, $-CH_2CH_3$, $-(CH_2)_w-N(R^{33})_2$ or a protecting group, or both $R^3$ together are a protecting group, or when $R^2$ is $-R^6-(CH_2)_t-N(R^{33})_2$, one $R^3$ is -H, $-CH_3$, $-CH_2CH_3$, a protecting group or $-(CH_2)_w-N(R^{33})_2$ and the other $R^3$ is -H, $-CH_3$, $-CH_2CH_3$, $-(CH_2)_w-N(R^{33})_2$, $-CH(N(R^{33})_2)-N(R^{33})_2$,




$R^5$ is independently H or a protecting group;

$R^6$ is independently -S-, $-NR^5-$, -O- or $-CH_2-$;

$R^7$ is independently linear alkyl having 1, 2, 3 or 4 carbon atoms optionally substituted with one -CH=CH-, -C=C- or $-CH_2-O-CH_2-$ moiety, or $R^7$ is cyclic alkyl having 3, 4 or 5 carbon atoms, wherein one of the linear alkyl carbon atoms is optionally substituted with a single $-CH_3$, -CN, =O,

-OH or protected hydroxyl, provided that the carbon atoms in any -CH=CH- or $-CH_2-O-CH_2-$ moiety are not substituted with =O, -OH or protected hydroxyl;

$R^8$ is linear alkylene having 1 or 2 carbon atoms wherein one alkylene carbon atom is optionally substituted with a single $-CH_3$, -CN, =O, -OH or protected hydroxyl, or $R^8$ is absent;

$R^{28}$ is independently $-CH_2-$, $-CH(CH_3)-$, $-CH(OCH_3)-$, $-CH(OR^5)-$ or -O-, but both are not -O-;

$R^{29}$ is independently -N-, $-N(CH_3)-$, -CH-, $-C(CH_3)-$, but both are not $-N(CH_3)-$;

$R^{30}$ is -H or $-N(R^3)_2$;

$R^{31}$ is the side chain of an amino acid;

$R^{33}$ is independently -H, $-CH_3$, $-CH_2CH_3$ or a protecting group;

$R^{35}$ is H, $C_1$-$C_4$ alkyl or a protecting group;

$R^{36}$ is H, $-CH_3$, $-CH_2CH_3$, a protecting group or an optionally protected monosaccharide;

t is 1, 2, 3 or 4, but when $R^6$ is -O-, -S- or $-NR^5-$, t is 2, 3 or 4;

v is independently 0, 1 or 2; and

w is independently 1 or 2.

4. (Previously Presented) The compound of claim 3 wherein $R^2$ is $-CH_2-(CH_2)_tN(R^3)_2$, $-NR^5-(CH_2)_tN(R^3)_2$, $-S-(CH_2)_tN(R^3)_2$, $-O-(CH_2)_tN(R^3)_2$, $-O-(CH_2)_tNR^5C(NR^5)N(R^3)_2$, $-(CH_2)_{1-2}-O-(CH_2)_tN(R^3)_2$, $-R^6-CH_2-CHR^{31}-N(R^3)_2$, $-R^6-(R^7)_v-N(R^3)_2$, $-R^6-(CH_2)_t-NR^5C(NR^5)N(R^3)_2$, or $-CH_2-(CH_2)_tNR^5C(NR^5)N(R^3)_2$.

5 (Original). The compound of claim 4 wherein t is 2.

6 (Original).The compound of claim 5 wherein $R^3$ independently is -H, $-CH_3$, $-C_2H_5$ or a protecting group.

7 (Original). The compound of claim 6 wherein $R^2$ is $-O-(CH_2)_2-NH_2$, $-O-(CH_2)_3-NH_2$, $-O-(CH_2)_2-N(CH_3)_2$, $-O-(CH_2)_3-N(CH_3)_2$, $-O-(CH_2)_2-NHCH_3$, $-O-(CH_2)_3-NHCH_3$, $-O-CH_2-CH(CH_3)-NH_2$, $-CH_2-O-(CH_2)_2-NH_2$, $-CH_2-O-(CH_2)_3-NH_2$ or $-(CH_2)_2-O-(CH_2)_2-NH_2$.

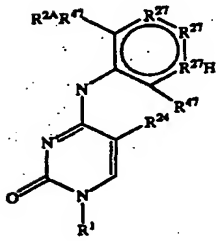
8 (Original). The compound of claim 3 wherein t is 2 or 3.

9 (Original). The compound of claim 1 wherein $R^1$ comprises -H, an optionally protected monosaccharide, hydroxyl, phosphate or hydrogen phosphonate.

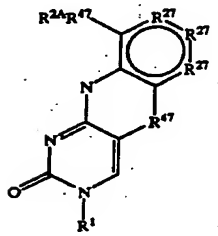
10 (Original). The compound of claim 1 wherein $R^1$ is optionally protected 2'-deoxy-$R^{21}$-substituted ribose, 2'-deoxyribose or ribose, wherein $R^{21}$ is H, -OH, halogen or a moiety that enhances the nuclease stability of an oligonucleotide containing the optionally protected 2'-deoxy-$R^{21}$-substituted ribose, 2'-deoxyribose or ribose.

11 (Currently Amended). The compound of claim 1 having the structure designated by the numbers selected from the group consisting of (104), (105), (133), (134), (111), (112), (113), ~~(115)~~ (114), (135), (136), (137), (138), (139), (120), (121), (121A), (143), (122), (123), (125), or (126):

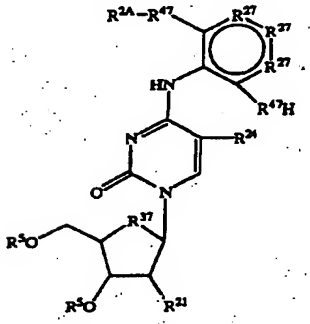
(104)



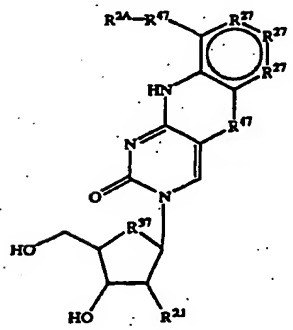
(105)



(133)



(134)



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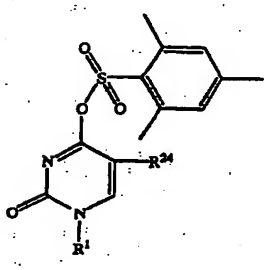
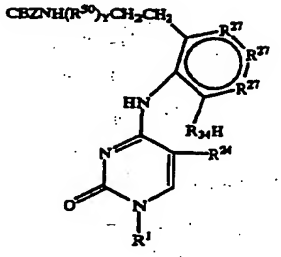
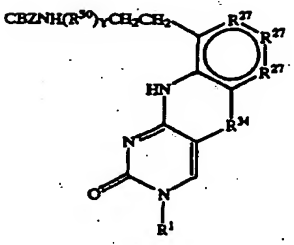
(111)



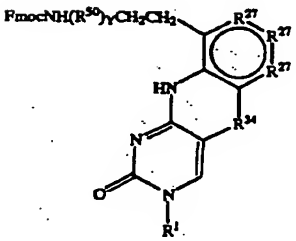
(112)



(113)



(114)



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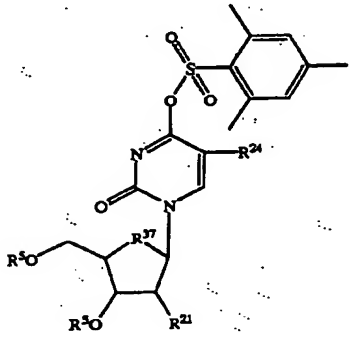
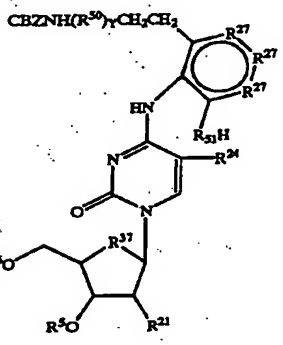
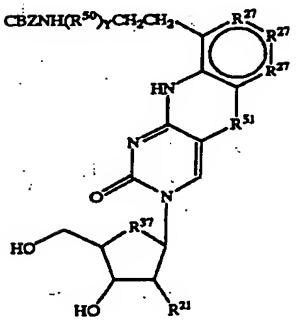
(135)



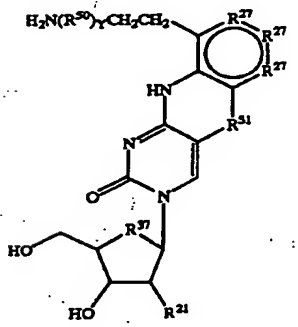
(136)



(137)



(138)



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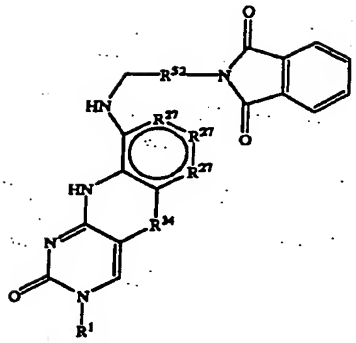
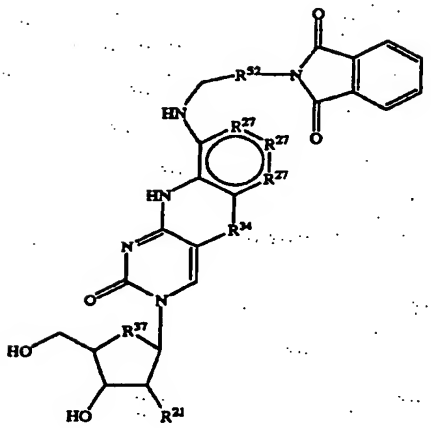
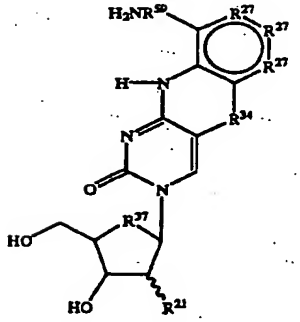
(120)



(143)



(122)



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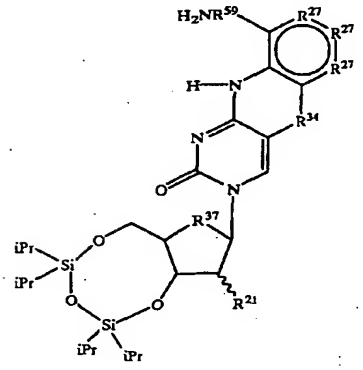
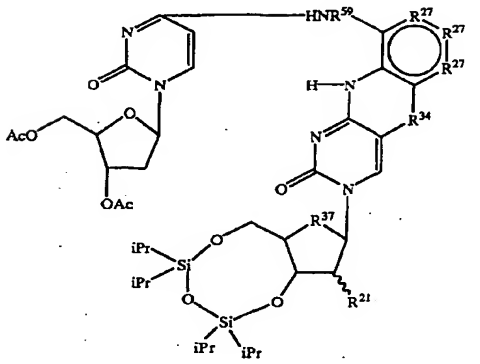
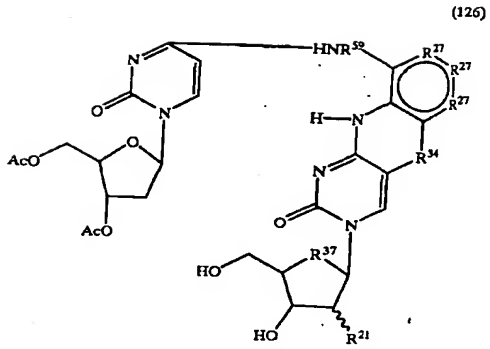
(123)



(125)

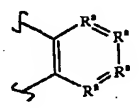


(126)



wherein

$R^1$ is an optionally protected monosaccharide;$R^{2A}$ is -OH; $R^5$ is independently -H or a protecting group; $R^6$ is -O-, -S-, -NH- or -CH2-, $R^{21}$ is H, -OH, halogen or a moiety that enhances the nuclease stability of an oligonucleotide; $R^{24}$ is a halogen; $R^{27}$ is independently -CH=, -N=, -$_C$($C_1$-$C_8$ alkyl)= or -C(halogen =, but no adjacent $R^{27}$ are both -N=, or two adjacent $R^{27}$ are taken together to form a ring having the structure,



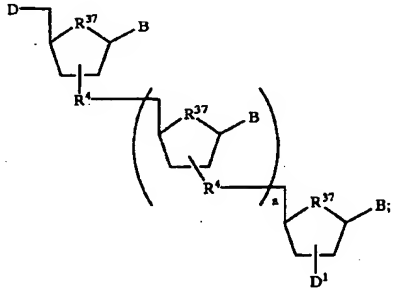
where

$R^a$ is independently -CH=, -N=, -C($C_{1-8}$ alkyl)= or -C(halogen)=, but no adjacent $R^a$ are both -N=; $R^{34}$ is -O-, -S- or -N($CH_3$)-; $R^{37}$ is -O-, -$CH_2$- or -$CF_2$-; $R^{47}$ is -O- or -S-; $R^{50}$ is -$CH_2$-, -C(O)-, -($CH_2$-O-$(CH_2)_2$-, -$(CH_2)_2$-$NR^5$-$(CH_2)_2$-, -{$(CH_2)_2$-S-$(CH_2)_2$-, -CH($N(R^5)_2$)-, -CH ($COOR^5$)- or -C($CH_3$)-, -C($C_2C_5$)- but adjacent moieties are not C(O); $R^{52}$ is -($CHR^{52A}$)-($R^{52B}$)-$CHR^{52A}$-, - $CHR^{52A}$-, -O-$CHR^{52A}$-, -$CHR^{52A}$-S-$CHR^{52A}$ -, -$CHR^{52A}$-$NR^5$-$CHR^{52}$A-, $C_1$-$C_{10}$ alkylene optionally substituted with 1 or 2 moieties selected from the group consisting of $C_1C_6$ alkyl, -$OR^5$, =O, -$NO_2$, -$N_3$, -CN, -$COOR^5$, or -$N(R^5)_2$, wherein any heteroatom is separated from the nitrogen atoms that $R^{52}$ is linked to by one methylene and one or more -$CHR^{52A}$-; $R^{52A}$ is -H or $C_1$-$C_6$ alkyl; $R^{52B}$ is a bond; $R^{59}$ is -$R^6$-$R^{60}$-; $R^{60}$ is -$(CH_2)_{Z3}$-$(R^{61})_{Z1}$-<$CH_2)_{Z2}$-; $R^{61}$ is -O-, -S-, -$NR^5$-, -C(O)-, -$CH_2$-O- $CH_2$-, -$CH_2$-$NR^5$-$CH_2$- or $CH_2$-S-$CH_2$-; Zl is 0 or 1; Z2 is 1, 2 or 3; Z3 is 1, 2 or 3; Y is 1, 2, 3 or 4; CBZ is carboxybenzoyl; Fmoc is 9-fluorenylmethoxycarbonyl; iPr is isopropyl; and

Ac is acetyl.

12 (Original). The compound of claim 1 wherein $R^1$ is an oligo-nucleotide having the structure (2):

(2)



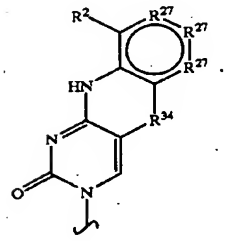
wherein D is -OH, protected -OH, an oligonucleotide coupling group or a solid support;

$D^1$ is an oligonucleotide coupling group, -OH, protected -OH or a solid support, wherein $D^1$ is bonded to one 2' or 3' position in the oligonucleotide of structure (2) and the adjacent 2' or 3' position in structure (2) is substituted with $R^{21}$, provided that D and $D^1$ are not both an oligonucleoide coupling group or they are not both a solid support; $R^4$ is independently a phosphodiester linkage or a phosphodiester substitute linkage, wherein $R^4$ is bonded to one 2' or 3' position in the structure (2) oligonucleotide and the adjacent 2' or 3' position in structure (2) is substituted with $R^{21}$;

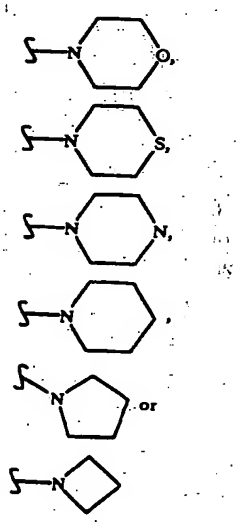
$R^{21}$ is independently -H, -OH, halogen or a moiety that enhances the oligonucleotide against nuclease cleavage; $R^{37}$ is independently -O-, $-CH_2-$, $-CF_2-$; n is an integer from 0 to 98; and

B independently is a purine or pyrimidine base or a protected derivative thereof, provided that at least one B is a base of structure (3)

(3)

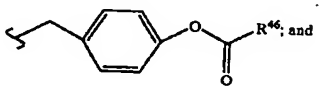


13 (Original). The compound of claim 12 wherein $R^4$ is independently 3'-O-P(S)(S)-O-5', 3'-O-P(S)(O)-O-5', 3'-O- P(O)(O)-O-5', 3'-O-P(Me)(O)-O-5', 3'-NH-P(O) (O)-O-5', 3'-S-$CH_2$-O-5', 2'-S-$CH_2$-O-5', 3'-O- $CH_2$-O-5', 2'-O-$CH_2$-O-5', 3'O-P(Me)(S)-O-5', 3'-$CH_2$-N($CH_3$)-O-5', 2'-$CH_2$-N($CH_3$)-O-5', or 3'-$R^{38}$-P($N_2$)(O)-O-5', wherein $R^{38}$ independently is -O-, -$CH_2$- or -NH-; $R^{39}$ is a protecting group; $R^{40}$ independently is hydrogen, a protecting group, $C_1$-$C_{12}$ alkyl optionally substituted with one, or two -O-, -C(O)-, -OC(O)-, -C(O)O-, -$OR^{42}$, -$SR^{43}$, -C(O)$NR^{39}$-, -C(O)N($R^{41}$)$_2$, -$NR^{41}$-, -N($R^{41}$)$_2$, halo, -CN, or -$NO_2$ moieties, or both $R^{40}$ together with the nitrogen atom to which they are attached form



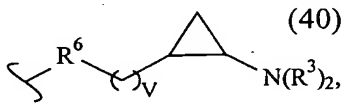
or both $R^{40}$ together are a protecting group;

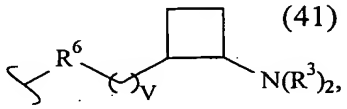
$R^{41}$ independently is hydrogen, a protecting group, alkyl ($C_1$-$C_4$ or both $R^{41}$ together are a protecting group; $R^{42}$ is hydrogen or a protecting group; $R^{43}$ is $C_{1-6}$ alkyl or a protecting group; and $R^{45}$ is - H, a counter ion or

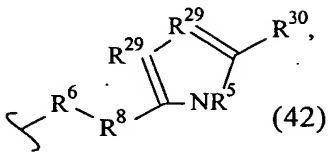



$R^{46}$ is alkyl containing 1-8 carbon atoms.

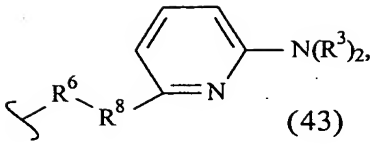
14. (Previously Presented) The compound of claim 1, wherein $R^2$ is $-R^6-(CH_2)_tNR^5C(NR^5)N(R^3)_2$, $-R^6-CH_2-CHR^{31}-N(R^3)_2$, $-R^6-(R^7)_v-N(R^3)_2$, $-R^6-(CH_2)_t-N(R^3)_2$, $-(CH_2)_{1-2}-O-(CH_2)_t-N(R_3)_2$,



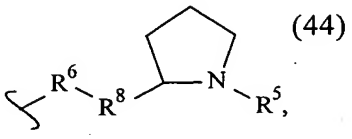





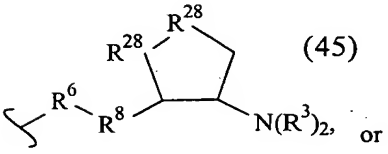
(42)



(43)

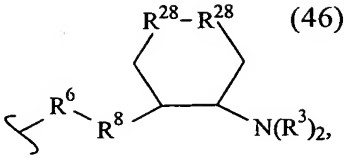


(44)



(45)

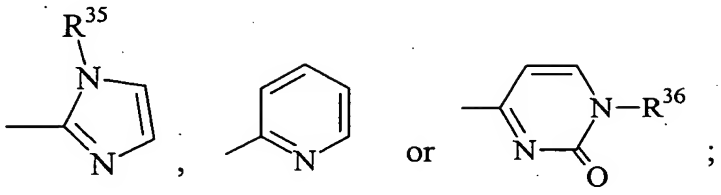
or



(46)

$R^3$ is independently -H, $-CH_3$, $-CH_2CH_3$, $-(CH_2)_w-N(R^{33})_2$ or a protecting group, or both $R^3$ together are a protecting group, or when $R^2$ is $-R^6-(CH_2)_t-N(R^{33})_2$, one $R^3$ is -H, $-CH_3$, $-CH_2CH_3$, a

protecting group or $-(CH_2)_w-N(R^{33})_2$ and the other $R^3$ is -H, $-CH_3$, $-CH_2CH_3$, $-(CH_2)_w-N(R^{33})_2$, $-CH(N(R^{33})_2)-N(R^{33})_2$,



$R^5$ is independently H or a protecting group;

$R^6$ is independently -S-, $-NR^5-$, -O- or $-CH_2-$;

$R^7$ is independently linear alkyl having 1, 2, 3 or 4 carbon atoms optionally substituted with one -CH=CH-, -C≡C- or $-CH_2-O-CH_2-$ moiety, or $R^7$ is cyclic alkyl having 3, 4 or 5 carbon atoms, wherein one of the linear alkyl carbon atoms is optionally substituted with a single $-CH_3$, -CN, =O, -OH or protected hydroxyl, provided that the carbon atoms in any -CH=CH- or $-CH_2-O-CH_2-$ moiety are not substituted with =O, -OH or protected hydroxyl;

$R^8$ is linear alkylene having 1 or 2 carbon atoms wherein one alkylene carbon atom is optionally substituted with a single $-CH_3$, -CN, =O, -OH or protected hydroxyl, or $R^8$ is absent;

$R^{28}$ is independently $-CH_2-$, $-CH(CH_3)-$, $-CH(OCH_3)-$, $-CH(OR^5)-$ or -O-, but both are not -O-;

$R^{29}$ is independently -N-, -$N(CH_3)$-, -CH-, -$C(CH_3)$-, but both are not -$N(CH_3)$-;

$R^{30}$ is -H or -$N(R^3)_2$;

$R^{31}$ is the side chain of an amino acid;

$R^{33}$ is independently -H, -$CH_3$, -$CH_2CH_3$ or a protecting group;

$R^{35}$ is H, $C_1$-$C_4$ alkyl or a protecting group;

$R^{36}$ is H, -$CH_3$, -$CH_2CH_3$, a protecting group or an optionally protected monosaccharide;

t is 1, 2, 3 or 4, but when $R^6$ is -O-, -S- or -$NR^5$-, t is 2, 3 or 4;

v is independently 0, 1 or 2; and

w is independently 1 or 2.

15. (Previously Presented) The compound of claim 14 wherein $R^2$ is -$CH_2$-$(CH_2)_t N(R^3)_2$, -$NR^5$-$(CH_2)_t N(R^3)_2$, -S-$(CH_2)_t N(R^3)_2$, -O-$(CH_2)_t N(R^3)_2$, -O-$(CH_2)_t NR^5C(NR^5)N(R^3)_2$, -$(CH_2)_{1-2}$-O-$(CH_2)_t N(R^3)_2$, -$R^6$-$CH_2$-$CHR^{31}$-$N(R^3)_2$, -$R^6$-$(R^7)_v$-$N(R^3)_2$, -$R^6$-$(CH_2)_t$-$NR^5C(NR^5)N(R^3)_2$, or -$CH_2$-$(CH_2)_t NR^5C(NR^5)N(R^3)_2$.

16 (Original). The compound of claim 15 wherein t is 2 or 3.

17 (Original). The compound of claim 16 wherein $R^3$ independently is -H, -$CH_3$, -$C_2H_5$ or a protecting group.

18 (Original). The compound of claim 17 wherein $R^2$ is $-O-(CH_2)_2-NH_2$, $-O-(CH_2)_3-NH_2$, $-O-(CH_2)_2-N(CH_3)_2$, $-O-(CH_2)_3-N(CH_3)_2$, $-O-(CH_2)_2-NHCH_3$, $-O-(CH_2)_3-NHCH_3$, $-O-CH_2-CH(CH_3)-NH_2$, $-CH_2-O-(CH_2)_2-NH_2$, $-CH_2-O-(CH_2)_3-NH_2$ or $-(CH_2)_2-O-(CH_2)_2-NH_2$.

19 (Original). The compound of claim 12 wherein $R^{21}$ is independently -H, -OH, halogen, protected hydroxyl, -O-methyl, O-ethyl, O-n-propyl, O-allyl, $-O-(CH_2)_2-OH$, $-O-(CH_2)_3-OH$, $-O-(CH_2)_2-F$, $-O-(CH_2)_s-R^{65}$, $-O-(CH_2)_2-[O-(CH_2)_2]_r-R^{65}$, $-O-(CH_2)_r-O-(CH_2)_r-O-(CH_2)_r-R^{65}$, -NH-methyl, -NH-ethyl, -NH-n-propyl, $-NH-(CH_2)_2OH$, $-NH-(CH_2)_3OH$, $-NH-(CH_2)_s-R^{65}$, -S-methyl, -S-ethyl, -S-n-propyl, -S-allyl, $-S-(CH_2)_2-OH$, $-S-(CH_2)_3-OH$, $-S-(CH_2)_2-F$, $-S-(CH_2)_s-R^{65}$, or $-S-(CH_2)_2-[O-(CH_2)_2]_r-R^{65}$, wherein:

$R^{65}$ is -H, -F, -OH, $-OCH_3$, $-NH_2$, -SH, protected hydroxyl, protected amino or protected thiol;

r is 1, 2, 3, or 4; and

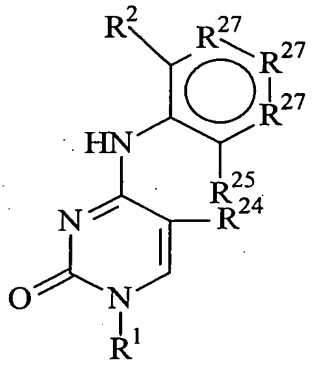
s is 2, 3, 4, 5, 6, 7 or 8.

20 (Original). The compound of claim 19 wherein $R^{21}$ is independently -H, -OH, -F, protected hydroxyl, $-OCH_3$, $-O-CH_2CH_3$, $-O-CH_2CH_2OH$, $-O-CH_2CH_2F$, $-O-CH_2CH_2CH_3$, $-O-(CH_2)_3OH$, $-O-(CH_2)_3F$, $-O-CH_2CF_2H$, $-O-CH_2CF_3$ or $-O-CH_2\ CH_2-O-CH_3$.

21 (Original). The compound of claim 12 wherein B independently are selected from the group consisting of a base of structure (3), guanosine, adenine, thymine, uracil, cytosine, 5-methylcytosine, 5-(1-propynyl)uracil, 5-(1-propynyl)cytosine, 5-(1-butynyl)uracil therefor 5-(1-butynyl)cytosine.

22 (Original). The compound of claim 12 wherein $D^1$ is H-phosphonate, a methylphosphonamidite, a β-cyanoethylphosphoramidite or phosphoramidite.

23 (Original). A compound having the structure (4):



(4)

and tautomers, solvates and salts thereof, wherein

$R^1$, $R^2$ and $R^{27}$ have the meanings given in claim 1;

$R^{24}$ is halogen;

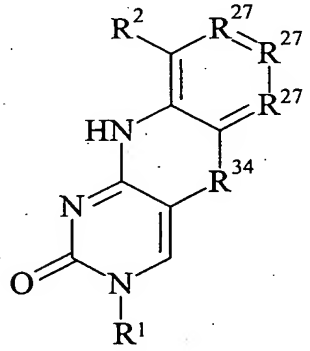
$R^{25}$ is -SH, -OH, =S or =O.

24 (Original). The compound of claim 23 wherein $R^1$ is -H, or an optionally protected monosaccharide.

25 (Original). The compound of claim 24 wherein the optionally protected monosaccharide is 2'-deoxy-$R^{21}$-substituted ribose, wherein $R^{21}$ is H, -OH, halogen or a moiety that enhances the nuclease stability of an oligonucleotide containing the optionally protected 2'-deoxy-$R^{21}$-substituted ribose, 2'-deoxyribose or ribose.

26 (Original). The compound of claim 25 wherein $R^{21}$ is -H, -OH, -F, protected hydroxyl, $-OCH_3$, $-O-CH_2CH_3$, $-O-CH_2CH_2OH$, $-O-CH_2CH_2F$, $-O-CH_2CH_2CH_3$, $-O-CH_2CH_2CH_2OH$, $-O-CH_2CH_2CH_2F$, $-O-CH_2CF_2H$, $-O-CH_2CF_3$ or $-O-CH_2CH_2-O-CH_3$.

27 (Original). A compound having the structure (1):




(1)

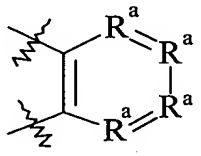
or tautomers, solvates or salts thereof, wherein:

$R^1$ is a protecting group, an oligonucleotide, a nucleic acid, a polysaccharide, an optionally protected monosaccharide, hydroxyl, phosphate, hydrogen phosphate, halo, azido, protected hydroxyl or -H;

$R^2$ is A(Z)X1, but R2 is not amine, protected amine, nitro or cyano;

$R^5$ independently H or a protecting group;

$R^{27}$ is, independently, -CH=, -N=, -C($C_1$-$C_8$ alkyl)= or -C(halogen)=, but no adjacent $R^{27}$ are both -N=; or two adjacent $R^{27}$ are taken together to form a ring having the structure:



$R^{34}$ is -O-, -S- or -N($CH_3$)-;

$R^a$ is independently -CH=, -N=, -C($C_{1-8}$ alkyl)= or -C(halogen)=, but no adjacent $R^a$ are both -N=;

A is a backbone chain of 2-16 carbon atoms, any 1, 2 or 3 of which are optionally replaced with N, O or S atoms, wherein the backbone chain is optionally substituted independently with 1, 2 or 3 of the following: $C_1$-$C_8$ alkyl, -$OR^5$, =O, -$NO_2$, -$N_3$, -$COOR^5$, -$N(R^5)_2$, or -CN groups, $C_1$-$C_8$ alkyl substituted with -OH, =O, -$NO_2$, -$N_3$, -$COOR^5$, -$N(R^5)_2$, or -CN groups, or any of the foregoing in which -$CH_2$- is replaced with -O-, -NH- or -N($C_1$-$C_8$ alkyl);

$X^1$ is 1, 2 or 3;

Y is H, 2-hydroxypyridine, N-hydroxysuccinimide, p-nitrophenyl, acylimidazole, maleimide, trifluoroacetate, an imido, a sulfonate, an imine 1,2-cyclohexanedione, glyoxal or an alpha-halo ketone; and

Z independently is -$NH_2$, -CHO, -SH, -$CO_2$Y, OY.

28 (Original). The compound of claim 27 wherein Z is bonded to a detectable label.

29 (Original). The compound of claim 27 wherein $R^1$ is an oligonucleotide.

30 (Original). The compound of claim 27 wherein $R^1$ is an optionally protected monosaccharide.